

Star Dust

Newsletter of National Capital Astronomers, Inc.

capitalastronomers.org

October 2015

Volume 74, Issue 2

Next Meeting

When: Sat. Oct 10th, 2015

Time: 7:30 pm

Where: UMD Observatory

Speaker: Timothy J. Stubbs

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Directions to Dinner/Meeting

Our time and location for dinner with the speaker before this meeting is 5:30 pm at "The Common," the restaurant in the UMD University College building located at 3501 University Blvd.

The meeting is held at the UMD Astronomy Observatory on Metzert Rd about halfway between Adelphi Rd and University Blvd.

Need a Ride?

Please contact Jay Miller, 240-401-8693, if you need a ride from the metro to dinner or to the meeting @ observatory. Please try to let him know in advance by e-mail at rigel1@starpower.net.

Observing after the Meeting

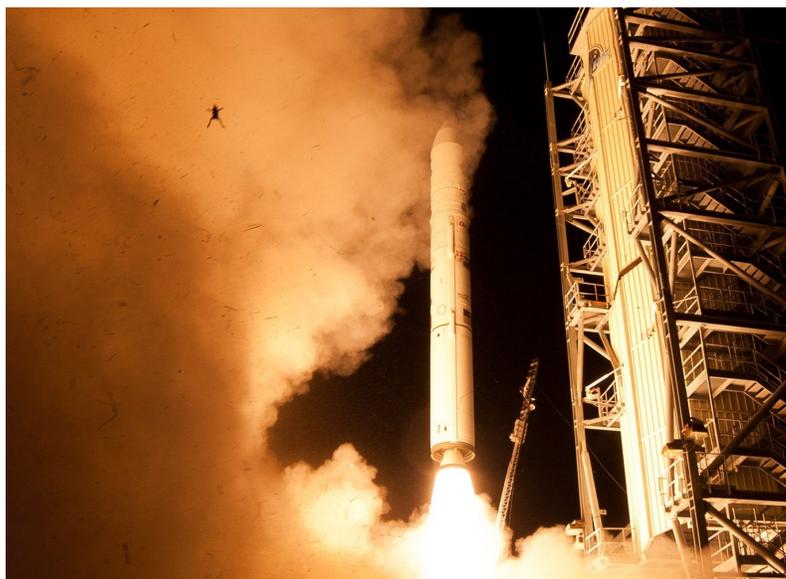
Following the meeting, members and guests are welcome to tour through the Observatory. Weather-permitting, several of the telescopes will also be set up for viewing.

The Impact of Meteoroids on the Moon

Timothy J. Stubbs, NASA's Goddard Space Flight Center

The Earth is being continually bombarded by tiny space rocks called meteoroids. We sometimes observe them as meteors or "shooting stars" in the night sky as they burn up in the atmosphere. These meteoroids, traveling at extremely high speeds, also hit the Moon. Without an atmosphere to protect it, meteoroids have unimpeded access to the lunar surface. The resulting impacts generate plumes of ejecta particles, melt and vapor, which lead to the formation of the lunar regolith (surface covering of soil and dust) and add material to the Moon's exosphere (the extremely thin atmosphere).

Meteoroids can be classified as either being part of a "stream" or part of the "sporadic background." Most meteoroids hitting the Earth and Moon start life as debris ejected from comets that then follow the orbit of the parent body and form a stream. Over time, these meteoroids spread out and the stream disperses to become part of the sporadic background, where meteoroids appear to be coming from all directions.



Courtesy NASA Wallops Flight Facility/Chris Perry

A spectacular picture of LADEE's night launch on September 6, 2013, from NASA's Wallops Flight Facility (Virginia). Also pictured is a small amphibian (upper left quadrant) that likely paid the ultimate price in mankind's quest to explore the Moon.

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Reminder

After the meeting, everyone is invited to join us at Plato's Diner in College Park. Plato's is located at 7150 Baltimore Ave. (US Rt. 1 at Calvert Rd.), just south of the university's campus. What if it's clear and you want to stick around and observe? No problem -- just come over when you're through. This is very informal, and we fully expect people to wander in and out.

Space Rock Primer II

Asteroids – Rocks orbiting the Sun. Some are “minor planet” sized (like Pallas) and some are smaller.

Comets – Icy space bodies (with possible rock cores) of frozen liquids & gases. Approaching the Sun causes the release of dust & gas in a trailing stream. Comets are also called “dirty snowballs” or “snowy dirtballs.”

Meteorites – Space bodies entering Earth's atmosphere & experiencing heating friction as well as subsequent trailing of glowing debris as they vaporize. Also called “shooting” or “falling” stars.

Meteorites – Pieces of a meteor that make it to Earth (also called “thunderstones” in previous centuries because some believed that they fell from thunderstorms).

Meteoroids – Small particles of comets or asteroids orbiting the Sun. In the 1960s, the IAU defined them as solid objects bigger than an atom and smaller than an asteroid that moved through space.

Micrometeoroids/Micrometeorites – Even smaller than meteoroids.



www.light2015.org/Home/CosmicLight.html

Impact of Meteoroids – continued from page 1

This talk will be a discussion on the observations from NASA's recent Lunar Atmosphere and Dust Environment Explorer (LADEE) mission. The mission has revealed surprising insights into the effects of meteoroid impacts on the lunar environment. What we learn from the Moon can be applied to many other “airless” bodies – in fact, this includes most objects in the Solar System!

Biographical Sketch:

Tim Stubbs is a Research Space Scientist in the Solar System Exploration Division at NASA's Goddard Space Flight Center. His current research interests focus on the environments of so-called airless bodies in the Solar System, in particular the Moon.

He has investigated processes including the electric charging of bodies (from small dust grains to large planets) in the space

environment, the transport of dust around the Moon, and the

dielectric breakdown or “sparking” of lunar soil due to exposure to space radiation. He has also explored the possibility that water ice could be hiding below the surface of asteroid 4 Vesta. Dr. Stubbs has been fortunate enough to be involved with some exciting planetary missions, including the Lunar Reconnaissance Orbiter (LRO) and the Lunar Atmosphere and Dust Environment Explorer (LADEE).



Courtesy NASA

“Veg-01” Update II



Courtesy NASA/Gioia Massa
Outredgeous Romaine
Lettuce on a Plant Pillow

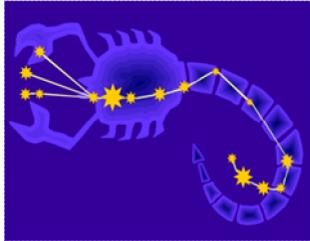
On May 8, 2014, the first experiment for growing fresh space food was initiated (“Veg-01”) in an apparatus called “Veggie,” which was installed in the Columbus module of the International Space Station (ISS) by the crew of Expedition 39. Veggie contained 6 plant pillows of hearty, outredgeous red romaine lettuce. The plants were ready for harvesting in 33 days and frozen clippings were sent back to Earth for studying and verifying safety (half of the plants were left on board the ISS for eating). Expedition 39 also had zinnia seed pillows to grow and enjoy while waiting for the lettuce test results.

Expedition 39 was finally informed that the space lettuce is safe for

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Exploring the Sky

“Exploring the Sky” is an informal program that, for over 60 years, has offered monthly opportunities for



anyone in the Washington area to see the stars and planets through telescopes from a location within the District of Columbia.

Presented by the National Park Service and National Capital Astronomers, sessions are held once a month, from April through November (unless it's raining or cloudy), in the field at the corner of Glover & Military Roads near the Rock Creek Park Nature Center in Washington, DC. Beginners (including children) and experienced stargazers are all welcome—and it's free!

More telescopes are always welcome; so, please bring one if you have one! If you don't have a telescope, the program can always use NCA members' expertise to answer questions and explain observations.

Hosted by: [National Capital Astronomers, Inc](#) and [Rock Creek Park](#)

2015 Observation Dates for Autumn

17 Oct (7:30 pm) - Perfect crescent moon; Vega overhead

7 Nov (7:00 pm) - Pleiades and winter constellations appear

Sky Watchers

Autumn Schedule

October

3-12	Evening – Globe at Night , Global. Features: <i>Constellation Pegasus</i> (N. Hemisphere) & <i>Sagittarius</i> (S. Hemisphere)
11	Overnight – Planets , N. Hemisphere. Uranus (in Constellation Pisces) at Opposition to Sun
14	Overnight – Galaxies , N. Hemisphere. M33/NGC 598 – <i>Triangulum</i> [RA 1:33:50, Dec +30°39'] (mag = 5.7, use binoculars or small telescope)
16	5:44 am – Planets , N. Hemisphere. Mercury (eastern sky)
21-22	12:00 am - Dawn - Meteors , N. Hemisphere. <i>Orionids</i> (debris from Comet Halley, radiant point west of Betelgeuse & Orion's “club”)
17	7:30 pm - Exploring the Sky , Local. Features: <i>Moon</i> & <i>Vega</i>
25	Pre-dawn – Planets , N. Hemisphere. Venus & Jupiter Conjunction (1° apart, southeastern sky in Constellation Leo)
27	8:05 am – Full Moon (moonrise time), N. Hemisphere. Other Moon Names: <i>Full Hunter's Moon</i> , <i>Full Sanguine Moon</i> , <i>Full Harvest Moon</i> (falling leaves, time to reap grain & time to stock up on meat for the winter)
28	Pre-dawn – Planets , N. Hemisphere. Venus, Mars & Jupiter Conjunction (planets form a 1° triangle, eastern sky in Constellation Leo)

Times EDT

Stellafane Award

Prasad Agrahar

As a member of NCA, I want to share my newly-received award certificate from the recent Stellafane Convention for my 8" Dobsonian (f/6.3). The telescope competition included entries from the east coast, the midwest and Canada. I was awarded Second Place in the “Small Optical Category” and a “First Scope” Certificate (awarded to competitors who are showcasing their first home-made telescopes). My scope was built at the Amateur Telescope-Making (ATM) workshop of NCA under the guidance of Guy Brandenburg and his team at the Chevy Chase Community Center (CCCC). The credit for my success truly belongs to

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Veg-01 Update – continued from page 2

consumption. This experiment's success has important implications, since humans are planning on visiting and living on other planets, specifically, Mars, for which trips are expected in the 2030s.



Courtesy NASA

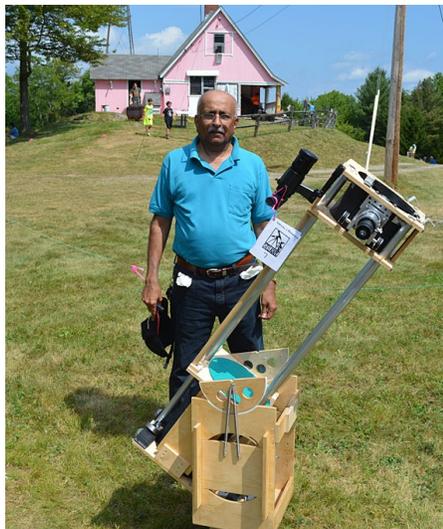
ISS astronauts sampling the first fresh produce grown in space.

The first taste of the lettuce was preceded by cleaning with a citrus-based wipe, then dipping the leaves into a simple dressing of balsamic vinegar and olive oil. After tasting the lettuce, astronaut Scott Kelly stated that "it tastes good. It kind of tastes like arugula."

Stellafane Award – continued from page 3

Guy and his team because, without their guidance, constant encouragement and support, I would not have done it. I had entered my scope in the convention competition for optics and mechanical consideration. I was hoping that my proudly-made Crayford Focuser would win some recognition (the Focuser was also made entirely at the CCC and was featured in a previous Star Dust newsletter).

My telescope now features many parts made with a 3-D printer, such as the tube in



*Courtesy Springfield Telescope Makers, Inc
NCA Member Prasad & his award-winning telescope on Breezy Hill (VT)*

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• Henry Bofinger, the NCA Secretary-
• Treasurer, at hbofinger@earthlink.net

Thank you!

Crayford Focuser

• Created by John Wall and named after
• the Crayford Manor House Astronomical
• Society (London), this telescope focuser
• can be made w/o "high precision
• machining," contributing to its favor
• among amateur telescope-makers. It's
• also valued for its focusing ability and its
• smooth motion (as the focus tube is
• spring-loaded & rolls along ball-bearings
• vs. the gear action of a rack-and-pinion
• system). Incidentally, one of the earliest
• examples of motion with rolling bearings
• has been found in tables from Caligula's
• Lake Nemi ships (Italy – 40 CE). The
• images on the 12th Dynasty tomb of
• Djehuti Hotep (Egypt/Kemet – 1900
• BCE) depict plain bearing (i.e., no
• rolling, like a dresser drawer in its side
• grooves).

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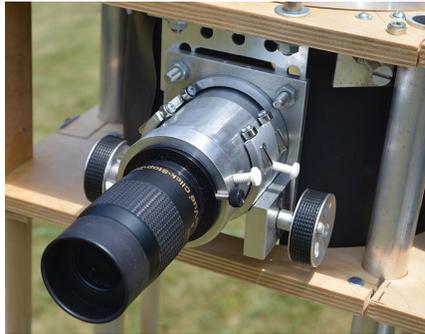
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hubble25th.org/

Stellafane Award – continued from page 5



Courtesy Springfield Telescope Makers, Inc
 Close-up of Prasad's Dobsonian

ABS Plastic

Acrylonitrile-Butadiene-Styrene (ABS) thermoplastic resin is a low-cost, easily-machinable plastic that can be painted and glued. It's strong, stiff and impact-resistant. The plastic is used for a variety of purposes, including food equipment (beige & black ABS are FDA food compliant), battery cases, camera bodies, furniture, luggage and appliances.

**Ready to build your own telescope and mirrors?
 See the *Calendar of Events* on page 7 of this newsletter for the current workshop schedule.**

...and the Answer is...

...the Hubble Telescope, featuring NCA Member Nancy Roman! That's according to illustrator/cartoonist Jok Church, when posed with a query from Trey Boyer of Dallas, Texas about the most beneficial science tool ever created. The September cartoon is reproduced below:

Hey Beakman, What is the best tool science ever invented? Who invented it?
 Trey Boyer
 Dallas, Texas

Beakman or Jax
 1130 Walnut Street
 Kansas City, MO 64106
 Questions, name & address

Hey Trey,
 The Hubble Space Telescope is probably the most successful tool we've ever had to answer questions about how things work.

One person did not invent the Hubble. It took many hundreds of people, but astronomer Nancy Roman is the person who created and headed NASA's committee to design a space telescope in the 1960s.

Beakman
 Beakman Place

Twinkle, twinkle...
 As lovely as it seems, the twinkling of stars at night was an enormous problem for astronomers. The twinkling comes from our air – our atmosphere wobbling the light from outer space.

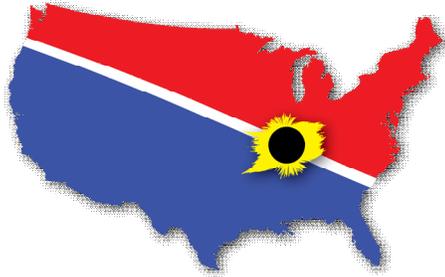
For a gallery of about 1,500 stunning images from above our atmosphere, visit tinyurl.com/clr7fy and be prepared to be amazed and delighted.

Big Questions
 How old is the universe? The Hubble telescope shows us that the universe is 13.7 billion years old.
 How many stars are there? It also lets us count that there are around 70 billion trillion stars (7 X 10²²) in our universe.

© Jok Church

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 NCA Member Nancy featured in "UCan Beakman Jax" Cartoon

The Great North American Eclipse



August 21st, 2017

<http://www.greatamericaneclipse.com/>

The submission deadline for the November issue of Star Dust is Oct. 30th.

Clear Skies!

Calendar of Events

- **NCA Mirror- or Telescope-making Classes:** Tuesdays and Fridays, from 6:30 to 9:45 pm at the Chevy Chase Community Center (intersection of McKinley Street and Connecticut Avenue, N.W.) Contact instructor Guy Brandenburg at 202-635-1860 or email him at gfbrandenburg@yahoo.com.
- **Open house talks and observing at the University of Maryland Observatory** in College Park on the 5th and 20th of every month at 8:00 pm (Nov.-Apr.) or 9:00 pm (May-Oct.). Details: www.astro.umd.edu/openhouse
- **Phoebe Waterman Haas Public Observatory** at the National Air & Space Museum, Solar viewing, Wed. - Sun., 12 - 3 pm (weather permitting).
- **Owens Science Center Planetarium:** "Planet Detectives," Fri. Oct. 9, 7:30 pm; \$5/adult; \$3/students/senior/teachers/military; children under 3 free. www1.pgcps.org/howardbowens
- **Saturday Star Party:** Sat. Oct. 17, 6:00 - 9:00 pm, Sky Meadows State Park, VA. airandspace.si.edu/events/star-parties/
- **Mid-Atlantic Senior Physicists Group:** "The Origin of Titan & Hyperion" with Douglas Hamilton (UMD), Wed. Oct. 21, at 1 pm at the American Center for Physics (1st floor conference room). www.aps.org/units/maspg/
- **Planetarium Patty's Plaza (P³) at the Owens Science Center Planetarium:** "Faces of Pluto" with Patty Seaton (lecture, Q & A and sky features), Fri. Oct. 23, 7:30 pm; \$5/adult; \$3/students/seniors. www1.pgcps.org/howardbowens
- **Upcoming NCA Meetings** at the University of Maryland Observatory:
 - **14 November:** Sergio Dieterich (Carnegie/DTM), "Red and Brown Dwarfs."

National Capital Astronomers Membership Form

Name: _____ Date: ___/___/___

Address: _____ ZIP Code: _____

Home Phone: ___-___-___ E-mail: _____ Print / E-mail Star Dust (circle one)

Membership (circle one): Student..... \$ 5; Individual / Family.....\$10; Optional Contribution.....\$__

Please indicate which activities interest you:

- Attending monthly scientific lectures on some aspect of astronomy _____
- Making scientific astronomical observations _____
- Observing astronomical objects for personal pleasure at relatively dark sites _____
- Attending large regional star parties _____
- Doing outreach events to educate the public, such as Exploring the Sky _____
- Building or modifying telescopes _____
- Participating in travel/expeditions to view eclipses or occultations _____
- Combating light pollution _____

Do you have any special skills, such as videography, graphic arts, science education, electronics, machining, etc.?

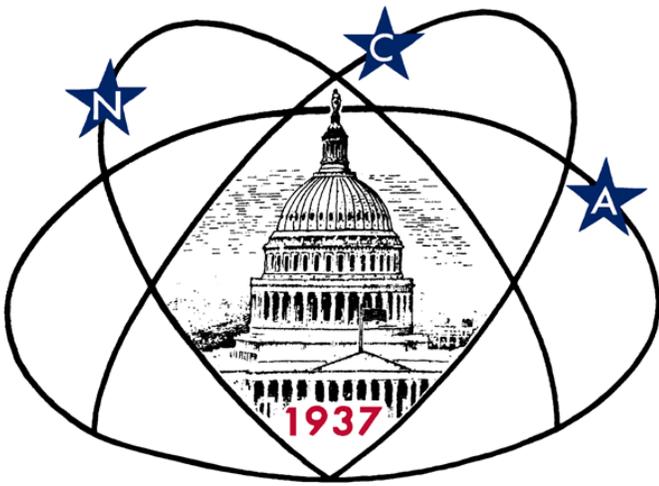
Are you interested in volunteering for: Telescope making, Exploring the Sky, Star Dust, NCA Officer, etc.?

Please mail this form with check payable to **National Capital Astronomers** to:
Henry Bofinger, NCA Treasurer; 727 Massachusetts Ave. NE, Washington, DC 20002-6007

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First Class
Dated Material



Next NCA Meeting:
2015 October 10th
7:30 pm
@ UMD Observatory
Timothy J. Stubbs

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